

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): A prospective abnormal shadow detecting system comprising:
 - a threshold value control means which stepwise sets a plurality of threshold values for binary-coding radiation image data of an object,
 - a binary image generating means which carries out binary-coding processing on the radiation image data by the use of each of the threshold values set by the threshold value control means, thereby generating a plurality of binary images,
 - a primary-label region extracting means which attaches a primary label to an isolated region in each of the binary images and extracts the isolated regions attached with the primary label as primary-label regions,
 - a growth score calculating means which calculates for each primary-label region a growth score for evaluating the likelihood that the primary-label region represents a growth, and
 - a prospective abnormal shadow region detecting means which compares the growth scores for the respective primary-label regions with each other and detects as the prospective abnormal shadow region a predetermined number of primary-label regions which are higher in the growth score than any of the others.

2. (previously presented): A prospective abnormal shadow detecting system as defined in Claim 1 further comprising a secondary-label region determining means which (i) judges whether the respective isolated regions have been extracted twice or more as the primary-label regions by the primary-label region extracting means, (ii) excludes the primary-label regions for the isolated regions extracted twice or more, leaving only the primary-label region having the highest growth score for each of the isolated regions extracted twice or more, as well as leaving the primary-label region or regions for the isolated region or regions extracted only once, (iii) attaches a secondary label to each of the primary-label regions which have been left after the exclusion of item (ii), and determines a growth score for each of the secondary-label regions on the basis of the growth scores for the respective primary-label regions which have been left after the exclusion of item (ii),

wherein the prospective abnormal shadow region detecting means compares the growth scores for the respective secondary-label regions with each other, and detects, as the prospective abnormal shadow regions, a predetermined number of secondary-label regions which are selected in the order of increasing growth score.

3. (original): A prospective abnormal shadow detecting system as defined in Claim 2 in which the threshold value control means stepwise sets a plurality of threshold values in the range covering all the pixel values which theoretically the pixel can take.

4. (original): A prospective abnormal shadow detecting system as defined in Claim 3 in which one step at which the threshold value control means stepwise sets a plurality of threshold values is fixed to a predetermined pixel value.

5. (original): A prospective abnormal shadow detecting system as defined in Claim 4 in which said predetermined pixel value is equal to the minimum unit of the pixel value.

6. (original): A prospective abnormal shadow detecting system as defined in Claim 2 in which the threshold value control means stepwise sets a plurality of threshold values in the range between a minimum pixel value which is minimum in the values of the pixels actually existing in the region of the object and a maximum pixel value which is maximum in the values of the pixels actually existing in the region of the object.

7. (original): A prospective abnormal shadow detecting system as defined in Claim 6 in which one step at which the threshold value control means stepwise sets a plurality of threshold values is fixed to a predetermined pixel value.

8. (original): A prospective abnormal shadow detecting system as defined in Claim 7 in which said predetermined pixel value is equal to the minimum unit of the pixel value.

9. (original): A prospective abnormal shadow detecting system as defined in Claim 2 in which one step at which the threshold value control means stepwise sets a plurality of threshold values is changed according to the pixel value range.

10. (original): A prospective abnormal shadow detecting system as defined in Claim 9 in which the one step is changed according to the class into which the pixel is classified in a histogram which shows the pixel value distribution in the radiation image data.

11. (original): A prospective abnormal shadow detecting system as defined in Claim 2 in which the growth score is calculated on the basis of at least one of the brightness, the circularity, and the size of the primary-label region.

12. (original): A prospective abnormal shadow detecting system as defined in Claim 1 in which the threshold value control means stepwise sets a plurality of threshold values in the range covering all the pixel values which theoretically the pixel can take.

13. (original): A prospective abnormal shadow detecting system as defined in Claim 12 in which one step at which the threshold value control means stepwise sets a plurality of threshold values is fixed to a predetermined pixel value.

14. (original): A prospective abnormal shadow detecting system as defined in Claim 13 in which said predetermined pixel value is equal to the minimum unit of the pixel value.

15. (original): A prospective abnormal shadow detecting system as defined in Claim 1 in which the threshold value control means stepwise sets a plurality of threshold values in the range between a minimum pixel value which is minimum in the values of the pixels actually existing in the region of the object and a maximum pixel value which is maximum in the values of the pixels actually existing in the region of the object.

16. (original): A prospective abnormal shadow detecting system as defined in Claim 15 in which one step at which the threshold value control means stepwise sets a plurality of threshold values is fixed to a predetermined pixel value.

17. (original): A prospective abnormal shadow detecting system as defined in Claim 16 in which said predetermined pixel value is equal to the minimum unit of the pixel value.

18. (original): A prospective abnormal shadow detecting system as defined in Claim 1 in which one step at which the threshold value control means stepwise sets a plurality of threshold values is changed according to the pixel value range.

19. (original): A prospective abnormal shadow detecting system as defined in Claim 18 in which the one step is changed according to the class into which the pixel is classified in a histogram which shows the pixel value distribution in the radiation image data.

20. (original): A prospective abnormal shadow detecting system as defined in Claim 1 in which the growth score is calculated on the basis of at least one of the brightness, the circularity, and the size of the primary-label region.

21. (previously presented): A prospective abnormal shadow detecting system as defined in Claim 1 in which the plurality of threshold values are determined by initially setting a first threshold value to a pixel value corresponding to a maximum value which the brightness of a pixel can take, and thereafter setting threshold values which are gradually reduced to the final threshold value corresponding to the minimum value which the brightness of a pixel can take.

22. (previously presented): A prospective abnormal shadow detecting system as defined in Claim 4 in which the predetermined pixel value is set independently of the radiation image data of the object.

23. (previously presented): A prospective abnormal shadow detecting system as defined in Claim 1 in which the stepwise setting of the plurality of threshold values is based on a uniform adjustment of the threshold.

24. (previously presented): A prospective abnormal shadow detecting system as defined in Claim 23 in which the stepwise uniform adjustment is based on imaged data distribution.

25. (previously presented): A prospective abnormal shadow detecting system as defined in Claim 1 in which the binary-coding processing binarizes whole images.

26. (previously presented): A prospective abnormal shadow detecting system, as defined in Claim 1, wherein the binary image generating means generates a plurality of binary images by performing the binary-coding processing on at least a part of the radiation image represented by the radiation image data using the plurality of threshold values.

27. (new): A prospective abnormal shadow detecting system as defined in Claim 2, wherein the respective isolated regions are extracted from two or more of the plurality of binary images.